

THE FOUNDATION OF ENTREPRENEURIAL INTENTION

Riccardo Fini¹, Rosa Grimaldi, Gian Luca Marzocchi, Maurizio Sobrero

ABSTRACT

Individual intentions influence human behaviors and, as a consequence, organizational outcomes. Therefore, the ability to understand and to predict intentions becomes a central issue in the managerial literature. In this contribution we study the formulation of entrepreneurial intentions. Drawing on a widely used intentional paradigm, the theory of planned behavior (Ajzen, 1991), we model the influence of individual characteristics and contextual variables on the intention formation process. Relying on a sample of 200 entrepreneurs, founders of 133 new-technology-based firms, we test a theoretical model of the micro-foundation of entrepreneurial intention. Our results show that entrepreneurial intention is influenced by psychological characteristics, by individual skills and by environmental influences. Managerial implications related to the creation of the conditions fostering entrepreneurial intentions within companies are discussed.

Keywords: entrepreneurial intention, process model, individual characteristics, theory of planned behavior, intention formation

¹ Corresponding author riccardo.fini@unibo.it
The four authors are affiliated with the Department of Management of the University of Bologna, Italy

1. INTRODUCTION

The role of intentions has been acknowledged to be relevant in the managerial literature (Sutton, 1998). Previous contributions show that intentions have the ability to predict both individual behaviors (Ajzen, 1991), and organizational outcomes such as survival, development and growth (Mitchel, 1981). Hence, the capability to understand and to predict intentions becomes a point of interest for both managers and entrepreneurs (Tubbs & Ekeberg, 1991).

In the entrepreneurship literature many scholars have focused on intentions (Bird, 1988; Krueger, Reilly, & Carsrud, 2000). Intentions have been proved to be the best predictors of individual behaviors particularly when the behavior is rare, hard to observe or involves unpredictable time lags (Krueger & Brazeal, 1994). The establishment of new ventures and the creation of new value in existing ones, which have been identified by Bird (1988) as the two outcomes of entrepreneurial intentions, are good examples of such behaviors.

The literature identifies individual domains (e.g. personality, motivation, and prior experience) and contextual variables (e.g. social context, markets, and economics) as the two dimensions responsible for the formation of entrepreneurial intentions (Bird, 1988). As for the first one, Zhao, Seibert, and Hills (2005) show that psychological characteristics (e.g. risk-taking propensity and entrepreneurial self-efficacy), together with developed skills and abilities, influence entrepreneurial intentions. Other scholars, studying the role of contextual dimensions, show that environmental influences (e.g. industry opportunities and market heterogeneity; Morris & Lewis, 1995) and environmental support (e.g. infrastructural, political, and financial support; Luthje & Franke, 2003) impact entrepreneurial intentions.

However, despite decades of research, scholars currently have only a limited understanding of the factors or of the processes through which entrepreneurial intentions

develop and come into existence (Markman, Balkin, & Baron, 2002). This has several explanations. First, previous research in this area has mainly an empirical orientation with scant theoretical contribution. Second, many studies have considered isolated variables, often without a clear theoretical rationale, as drivers of entrepreneurial intentions (Zhao et al., 2005). To this regard, we have learned that, from an empirical point of view, both individual and contextual domains are poor predictors. That is, predicting entrepreneurial intentions by modeling only individual or contextual factors as isolated domains, usually resulted in disappointingly small explanatory power and even smaller predictive validity (Krueger et al., 2000).

A different and more rigorous approach to entrepreneurial intentions is rooted in the psychological literature, where intentions have been studied in terms of process models (intention models). These models, which include models based on the theory of planned behavior (Ajzen, 1991), offer a coherent, parsimonious, highly-generalizable, and robust theoretical framework for understanding and predicting intentions (Krueger et al., 2000). More specifically, if applied to entrepreneurial settings, these models offer an opportunity to better understand and predict entrepreneurial activities.

Despite the increasing attention toward intention models, no previous attempts have been made to include and model both individual and contextual variables, and to assess the impact that these dimensions have on entrepreneurial intention.

Our paper aims at filling this gap. We first draw on the theory of planned behavior (Ajzen 1991), according to which intentions are determined by attitudes, and attitudes are affected by individual and contextual variables (which can therefore be considered indirect predictors of intentions). We then extend the theory of planned behavior by providing a set of antecedents for attitudes and we test a theoretical model of the micro-foundation of the entrepreneurial intention. We build our model of causal antecedents of entrepreneurial

intention on constructs which have already been used extensively, and validated in sociological and psychological studies. The antecedents that we consider in our model are: psychological characteristics (Baum, Locke, & Smith, 2001); individual skills (Gupta & Govindarajan, 2000); environmental support (Fini, Grimaldi, & Sobrero 2008); and environmental influence (Miller & Friesen, 1982b).

We rely on a sample of 200 entrepreneurs, founders of 133 new-technology-based firms, from whom we gathered information using face-to-face interviews. We use a structural equation modeling approach (LISREL 8.80, Joreskog & Sorbom, 2006) to perform the empirical analysis.

Our results show that attitudes directly predict entrepreneurial intention, while psychological characteristics, individual skills and environmental influence have only an indirect impact. The environmental support doesn't predict entrepreneurial intention.

This study makes two contributions to entrepreneurship research. First, it provides a theoretical explanation, extending the theory of planned behavior (Ajzen, 1991), for the influence of individual-level antecedents on the formation of entrepreneurial intentions. Second, it empirically assesses the predictive validity that individual and contextual variables have on entrepreneurial intentions.

The rest of the paper is structured as follows: in Section 2 we define the entrepreneurial intention concept and its foundation, while in Section 3 we present our entrepreneurial intention model. Section 4 describes the research design and methods and in Section 5 we discuss our results. A final section concludes with discussion and implications.

2. ENTREPRENEURIAL INTENTION: ROLE AND FOUNDATION

2.1 The role of entrepreneurial intention

According to cognitive approaches, intentions occupy a central position in the study of human behaviors (Tubbs & Ekeberg, 1991). As Ajzen and Fishbein (1980) argue in their seminal contribution: most behaviors of social relevance, such as health-related behaviors or the establishment of new organizations, are under volitional control. Several scholars, sharing this view and questing for theoretical and empirical evidence, have proved that intentions are the best single predictor of such volitional behaviors (Bagozzi, Baumgartner & Yi, 1989; Ajzen, 1991; Sutton, 1998).

Scholars have characterized intention in many ways. In her work, Bird (1988) defines it as a state of mind directing a person's attention (and therefore experience and action) toward a specific object (goal), or a path, in order to achieve something (means). Tubbs and Ekeberg (1991) state that an intention can be described as a cognitive representation of both the objective (or goal) one is striving for and the action plan one intends to use to reach that objective. Central to both definitions is the role of the objectives (or goals) and their ability to foster and influence intention.

Bird (1988) and Shane and Venkataraman (2000) support the view that the two objectives (or goals) that mainly characterize entrepreneurship are the establishment of new independent firms, and the creation of new value in existing ones.

In line with this view, we define entrepreneurial intention as a cognitive representation of the actions to be implemented by individuals to either establish new independent ventures or to create new value within existing companies.

It is certainly true that entrepreneurial ideas begin with inspiration; though intentions are needed in order for them to become manifest (Delmar & Shane, 2003). Consistent with this approach, Krueger et al. (2000) argue that individuals do not start a business as a reflex,

but they do it intentionally. Hence, especially at the birth of an organization, the impact of the entrepreneur's intention is predominant; also because the influences of external stakeholders, corporate structure, politics, image, and culture have not yet been established (Bird, 1988). As a consequence, the founder's intention determines the form and the direction of a nascent organization at its inception.

Entrepreneurial intentions also influence the actions of existing organizations. In established firms, as a result of intentional processes, individuals pursue and exploit opportunities (Stevenson & Jarillo, 1986). Consequently, existing organizations embody and elaborate intentions that, ultimately, affect a venture's success. As an example, Mitchel (1981) argues that CEOs' and entrepreneurs' intentions directly affect the organizations that they lead. Supporting this position, Wiklund (1999) shows that CEOs' intentions toward the creation of new value within existing organizations, which is accomplished through innovative, proactive, and risky actions (Miller, 1983), have an impact on venture growth. Following a similar approach, Wiklund and Shepherd (2003) empirically demonstrate that the intention to be innovative, proactive, and take risks enhances a firm's performance.

Once we have acknowledged the relevance of entrepreneurial intention, we might ask what are the factors that trigger and enact individual intention. In the following section we provide a detailed characterization of such factors.

2.2 The antecedents of entrepreneurial intention

The extant literature acknowledges a variety of factors as responsible for the formation of entrepreneurial intention. Scholars have grouped them into two macro-categories, identifying the individual and the contextual domains (Bird, 1988). The first one includes demographics, personal traits, psychological characteristics, individual skills and prior knowledge, individual network and social ties. The second one encompasses environmental

support, environmental influences and organizational factors. In the following section, based on the extant literature, we review the factors comprising the two identified domains².

2.2.1 Individual domain

Demographics. Since the early contribution of Roberts (1991) on individual characteristics of high-tech entrepreneurs, several papers have looked at demographics in order to identify the factors responsible for entrepreneurial-intention formation. Most of them have looked at gender and age. Dealing with gender, Reynolds, Carter, Gartner, Greene, and Cox (2002) show that adult men in the United States are twice as likely as women to be in the process of starting a new business. Furthermore, research on the career interests of teens, the potential entrepreneurs of the next generation, has revealed significantly fewer intentions among girls than among boys to get engaged in entrepreneurial careers (Kourilsky & Walstad, 1998). Dealing with age, Boyd (1990) shows that it is positively correlated with entrepreneurial intention. More specifically, Bates (1995) demonstrates that the intention and, as a result the likelihood to be entrepreneurial, increases with age, peaking as people approach age 40 and then leveling out. Also, marital status has been studied as an antecedent of entrepreneurial intention. Evans and Leighton (1989), in their study on ethnicity, show that married individuals are more likely to get engaged in entrepreneurial activities. Employment status is another characteristic that has been taken into account. Results provided by Ritsila and Tervo (2002) show that there is a positive effect of personal unemployment on the intention of an individual to get engaged in entrepreneurial activities. Specifically, personal unemployment

² Although some might argue otherwise, we believe that entrepreneurial behavior, or the creation of a new venture and/or the creation of new value in existing firms, is a planned behavior (Krueger, Reilly, & Carsrud, 2000). It has been demonstrated that intentions are the best and closest predictors of planned behaviors (Ajzen, 1991). Therefore, relying on both theoretical and empirical contributions, we argue that all dimensions that predict entrepreneurial behaviors also act as predictors of entrepreneurial intentions. Thus, because of the small number of studies that address and explore the antecedents of entrepreneurial intention, we have included, in the review we conducted, the contributions that are focused on the foundation of either entrepreneurial intention or entrepreneurial behavior.

and job insecurity have been identified as the two factors that directly influence entrepreneurial intention (Storey, 1991).

*Personal traits*³. Dealing with a set of general and stable personality traits, scholars have argued that overconfidence (Busenitz, 1999), optimism (Cooper, Woo, & Dunkelberg, 1988), tenacity (Gartner, Gatewood, & Shaver, 1991) and passion (Locke, 1993) may have an impact on entrepreneurial intention. Consistent with this “trait-approach”, many of them have been extensively included in entrepreneurial studies but, despite the theoretical rationale, they have resulted in a little explanatory power, failing to predict entrepreneurship (Gartner, 1989).

Psychological characteristics. Several psychological characteristics have been proposed to influence entrepreneurial intention. The first attempt to study the willingness and drive of individuals to get engaged in entrepreneurial activities can be traced back to the psychological studies of Atkinson (1957) and McClelland (1961). In order to provide a better characterization of entrepreneurs, McClelland (1961) introduced the need-for-achievement concept. He argued that individuals with a high level of need-for-achievement show higher willingness to engage in entrepreneurial activities. However, the concept of need-for-achievement is not the only psychological dimension that scholars have studied in relation to entrepreneurial intention. In addition to that, the literature demonstrates that individuals’ entrepreneurial intention is influenced by risk-taking propensity (Stewart and Roth, 2001; Weber, Blais, & Betz, 2002), tolerance of ambiguity (Budner 1982), locus of control (Evans & Leighton, 1989; Cromie & Johns, 1983), self-efficacy (Baum et al., 2001; Zhao et al., 2005) and goal setting (Locke & Latham, 1990). While some of them have failed to predict

³ Personal traits are individual attributes considered stable and unchangeable, conversely psychological characteristics are individual dimensions that can change as a result of influences coming from social relations, and organizational and environmental exposure.

entrepreneurship (Baum et al., 2001), two dimensions that consistently predict entrepreneurial intentions are self-efficacy (Zhao et al., 2005) and risk-taking propensity (Gomez-Meija & Balkin, 1989).

Individual skills and prior knowledge. Wiklund and Shepherd (2003) argue that both entrepreneurial intentions and behaviors can be conceptualized as functions of entrepreneurs' personal abilities. Background and skills accumulated by each entrepreneur are, in fact, predictors of entrepreneurial activities. Roberts and Fusfeld (1981) argue that a high level of managerial skills is a requirement for individuals involved in high-technology firms, while Gupta and Govindarajan (2000) state that technical and procedural skills are fundamental in knowledge-intensive entrepreneurial environments. Baum et al. (2001) empirically show that technical, procedural and managerial skills have an impact on entrepreneurship. Also prior knowledge, defined by Shane (1999) as the stock of information generated through people's idiosyncratic life experiences, influences entrepreneurial intention. In particular, knowledge generated through career experience (Shane & Khurana, 2003; Evans & Leighton, 1989), serial entrepreneurship (Kolvereid, 1996), and patenting (Roberts, 1991) have been demonstrated to foster entrepreneurial activities.

Social ties and network. By structuring the context in which entrepreneurs must act, social networks affect entrepreneurial intentions (Aldrich, 1999). In the extant literature, social ties and networks have been identified as dimensions responsible for individual entrepreneurship. Network analysts argue that entrepreneurship is a consequence of taking the opportunity to be the tertius, to be between others (Burt, 1992). More generally, Aldrich (1999) demonstrates that social ties, in terms of their heterogeneity and emotional strength, play an important role in many facets of entrepreneurial activities.

Lumpkin and Dess (1996) show that ventures with strong entrepreneurial orientation particularly benefit from occupying network positions rich in brokerage opportunities because, as a result of CEOs' and entrepreneurs' intentional processes, they can apply decision styles that favor the pursuit of innovative opportunities. In a recent work, Stam and Elfring (2008) underline the importance of fit between entrepreneurs' social capital resources and the unique resource needs associated with an entrepreneurial orientation. More specifically they find that the combination of high network centrality and extensive bridging ties strengthens the relationship between entrepreneurial orientation and performance.

2.2.2 Contextual domain

Environmental support. Entrepreneurial activities may also be explained by the influences of the surrounding business environment. Scholars have emphasized that government policies, characteristics of the local context (e.g. availability of logistic infrastructure, financial investors, and externalities) and, more specifically, university support mechanisms influence entrepreneurial activities (Morris & Lewis, 1995; Fini et al., 2008). Governments may intervene with funding schemes, tax policies and other support mechanisms that are aimed at mitigating market inefficiencies and promoting entrepreneurship (Lerner, 1999). As for local context, several studies have focused on the ability that a fertile environment, rich in both tangible (physical infrastructure, corporate physical assets, R&D laboratories) and intangible (human capital, routines) resources, has in fostering entrepreneurial intention (Niosi & Bas, 2001). In particular, financial support, such as venture capital availability (Beck, Demirguc-Kunt, & Maksimovic, 2005), and entrepreneurial support services, such as training opportunities, small loans, physical infrastructure and business plan competition (Feldman, 2001; Foo, Wong, & Ong, 2005), have been identified as leading factors in the support of entrepreneurship. Finally, scholars have argued that specific university support mechanisms

are also relevant in fostering technology transfer activities and, consequently, in supporting entrepreneurial actions. The set of policies and instruments that have been put in place by universities in order to support academic entrepreneurship (among other things) is quite varied, including technology transfer offices and faculty consultants (Mian, 1996), university incubators and physical resources (Mian, 1997), and university venture funds (Lerner 2005).

Environmental influence. Several contributions have focused on the predictive power that the environment has on entrepreneurial intentions and behaviors (Wiklund, 1999; Wiklund & Sheperd, 2003). With specific regard to the creation of new independent ventures, scholars have shown that start-ups are not evenly distributed across all high-technology industries: biotechnology and computer software are the two most common such industries in the United States (Lowe, 2002). Industry characteristics may drive individuals' entrepreneurial intentions. An important dimension is represented by the effectiveness of patents in an industry. The creation of new ventures is more likely to occur in industries in which patents are more effective. Hsu and Bernstein (1997) report that the strength of patent protection in a technical field is important in explaining the willingness of individuals to found new companies and to foster entrepreneurial behaviors.

Moreover, the more dynamic and competitive the environment, the greater the need for innovation and the more likely it is that firms will be innovative (Meyers & Marquis, 1969). Companies operating in many different markets are likely to learn from their broad experience with competitors and customers. They will tend to borrow ideas from one market and apply them in another. This market heterogeneity affects the organizational diversity (personnel, procedures, technologies, and administrative practices) and the greater this diversity, the greater the probability that organization members will be more entrepreneurial, thus conceiving new innovative ideas (Miller & Friesen, 1982a).

Organizational factors. Along with the reviewed dimensions, organizational-related dimensions also account for entrepreneurial intention formation. These factors are particularly relevant for individuals willing to promote entrepreneurship through the creation of value within existing firms. Covin and Slevin (1988) have examined the influence of organizational structure on top management entrepreneurial intentions. They compare organically-structured firms and mechanistically-structured firms and they find a direct and positive relationship between organic organizations and top management's entrepreneurial intention. On top of organizational structure *strictu sensu*, there are other organizational factors that may be specifically supportive to entrepreneurship. Burgelman (1983) shows that new managerial and organizational approaches, as well as innovative administrative arrangements, are required to facilitate the collaboration between entrepreneurial participants and the organizations in which they are active.

3. ENTREPRENEURSHIP AS AN INTENTIONAL, PLANNED BEHAVIOR

3.1 An intention model: the theory of planned behavior

As we have mentioned above, individual and contextual domains, when considered isolated from other factors and not grounded in theoretical frameworks, are poor predictors of entrepreneurial intention. Some scholars, in order to fill part of this void, have undertaken a multi-disciplinary approach, adopting the so-called process models (or intention models), that have been widely used in psychological studies (Ajzen & Fishbein, 1980). These models, assuming that some behaviors are under volitional control, embody the idea that intentions are the best predictors of behaviors.

A widely accepted theoretical approach, which strongly emphasizes this intentional-behavioral relation, is the theory of planned behavior (Ajzen, 1991). The theory encompasses five specific domains: attitude towards behavior, subjective norms, perceived behavioral

control, intention to behave, and behavior. Attitude towards behavior refers to perceptions of personal desirability of performing the behavior. Subjective norms are defined as the approval (or disapproval) that important referent individuals (or groups) have in relation to the enactment of a given behavior. Perceived behavioral control can be seen as the person's belief related to how easy (or difficult) the enactment of the behavior is likely to be. Intentions, instead, are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior (Ajzen, 1991).

According to the theory, attitudes, subjective norms and perceived control predict intentions, while intentions and perceived control predict behavior. Central to this theory is the role of intentions and their power in predicting focal behavior (Ajzen, 1991).

3.2 The micro-foundation of entrepreneurial intention: the conceptual model

Several contributions have addressed the creation of new value within existing firms (excluding the establishment of new ventures), as the most challenging part of the entrepreneurial process (Baum et al., 2001). Our aim, in this paper, is to shed some light on the foundation of this value creation process, looking at entrepreneurial intention as individuals' willingness to create new value within existing firms (Bird, 1988). In particular, we refer to the creation of value within established companies as the generation of profitable situations that occur through the enactment of innovative, proactive and risky actions.

We identify a set of antecedents for the three exogenous variables of the theory of planned behavior. First, attitude towards entrepreneurial behavior (in our specific case: individuals' desire to create value through the engagement in innovative, proactive and risky actions). Secondly, subjective norms (in our specific case: entrepreneurs' perception of approval by important referent individuals in relation to their involvement in the creation of new value through the engagement in innovative, proactive and risky actions). Thirdly,

perceived entrepreneurial behavior control (in our specific case: individuals' beliefs relating to how easy it is for them to create value through the engagement in innovative, proactive and risky actions).

We draw on the individual and contextual domains that we reviewed above, and we identify a set of predictors for attitude toward entrepreneurial behavior and perceived entrepreneurial behavior control. Although, we have gathered information for all the reviewed domains, our model includes only a sub-sample of them (four domains). We model psychological characteristics, individual skills, environmental support, and environmental influence. We exclude demographics and personal traits because of their proved inefficacy in predicting entrepreneurial intentions. We do not include social ties and network, as we see social relations as both antecedent and underlying dimensions of the four identified micro-domains. In other words, social ties affect both individual and environmental related factors: individuals' networks (number of relations, centrality, frequency of interactions, etc.) influence their psychology, the competencies that they develop, the way they perceive external support, and their perceptions of the external environment. Finally, we deal with organizational factors only indirectly, targeting a sample of young new-technology-based firms characterized by similar and very "entrepreneurial" types of organizations.

We do not investigate the antecedents of subjective norms for three main reasons. First, subjective norms are referred to the approval (or disapproval) that important referent individuals (or groups) have in relation to the enactment of the entrepreneurial behavior. Consequently, in order to come up with a set of predictors for that measure we should study referent individuals' intention processes and, consequently, model their foundations. This exceeds the purpose of this contribution. Second, subjective norms are the less field-specific predictor of entrepreneurial intention. Attitude toward entrepreneurial behavior and perceived entrepreneurial behavior control find a specific characterization within the entrepreneurship

domain and, as a result, field-specific predictors can be employed in studying their foundations. Third, several studies demonstrate that subjective norms often fail to predict intentions (Armitage & Conner, 2001). Thus, because of the exploratory nature of our study and because of the limited number of variables that we can model, we decided to drop the direct predictors of this metric. Figure 1 illustrates our model.

Insert Figure 1 about here

3.2.1 Antecedents of attitude towards entrepreneurial behavior

We select psychological characteristics and individual skills as the two direct predictors of attitude towards entrepreneurial behavior (e.g. individuals' desire to create value within an existing firm).

With regard to the first one, scholars have theoretically demonstrated that psychological characteristics predict entrepreneurship (McClelland, 1961). Notwithstanding, the evidence about how psychological dimensions influence entrepreneurial intentions is largely anecdotal and several studies resulted in disappointingly small explanatory power and even smaller predictive validity. Only two dimensions, namely entrepreneurial self-efficacy (Zhao et al., 2005), and risk-taking propensity (Gomez-Mejia & Balkin, 1989), have proved to predict entrepreneurial intentions consistently. Moreover, in studying the attitude formation process, scholars have also shown that entrepreneurial self-efficacy (O'Neill & Mone, 1998; McDonald & Siegall, 2001), and risk-taking propensity (Luthje & Franke, 2003), have a direct and significant impact on attitudes. In their contribution, Eagly and Chaiken (1993) provide an extensive review of the theories that have addressed the attitude formation process. Specifically, the idea that psychological characteristics, in terms of emotional and motivational forces, impinge upon the cognitive system and influence attitudes has been central to three broad theoretical traditions: the reinforcement perspective (Hovland, Janis, &

Kelley, 1953), the cognitive consistency perspective (Heider, 1946) and the functional perspective (Katz, 1960). Drawing on all these theories, we hold that psychological characteristics contribute to attitude formation. We identify entrepreneurial self-efficacy and risk-taking propensity as underlying dimensions of a second-order factor that we label psychological characteristics, and we model its impact on attitude toward entrepreneurial behavior.

As for individual skills, some scholars hold that skills and competencies play a role in the determination of attitudes. Kolvereid (1996) shows that attitudes mediate the relationship between skills and entrepreneurial intention. These findings are coherent with the assumption of Ajzen and Fishbein (1980), who have argued that developed competencies have only an indirect impact on specific intentions, by influencing some of the factors that are more closely linked to them (e.g. attitudes). Also Shapero and Sokol (1982), as well as Souitaris, Zerbinati, and Al-Laham (2007), reinforce this position, clearly stating that individual skills directly impact on attitudes and indirectly on intentions.

As we have previously illustrated in the literature review, individual skills and prior knowledge represent a multidimensional concept. Scholars have identified several dimensions that might be useful for its characterization, such as technical, procedural, and managerial skills (Baum et al., 2001), patenting (Roberts, 1991) and serial entrepreneurship (Kolvereid, 1996). Among them, for the purpose of our modeling, we use technical, procedural and managerial skills. We believe that these dimensions also include specific knowledge and particular skills that individuals might have developed through prior experiences (i.e. patenting and previous entrepreneurial activities). Consistent with this position, we hold that technical, procedural, and managerial skills affect the formation of entrepreneurial attitudes.

Therefore, we model technical, procedural and managerial skills as underlying dimensions of a second-order factor, labeled individual skills, and we assess its direct impact on attitudes toward entrepreneurial behavior.

3.2.2 Antecedents of perceived entrepreneurial behavior control

We identify environmental support and environmental influence as the two domains responsible for perceived entrepreneurial behavior control (e.g. individuals' beliefs relating to how easy it is for them to create value through the engagement in innovative, proactive and risky actions).

As has been already argued, environmental support has an impact on the enactment of entrepreneurial intentions and behaviors. Scholars have assessed the impact that government, context, and university support mechanisms have on the enactment of entrepreneurial behaviors (Fini et al., 2008). Governments, with funding schemes and tax policies (Lerner, 1999), local contexts, with physical infrastructure (Niosi & Bas, 2001), financial support (Beck et al., 2005), and entrepreneurial support services (Foo et al., 2005), as well as universities with technology transfer offices (Mian, 1996), university incubators and physical resources (Mian, 1997), play a relevant role in fostering and supporting entrepreneurial behaviors. More specifically we argue that the existence of external support mechanisms positively influences the control that individuals have over their ability to implement entrepreneurial behaviors. In other words, when external support is in place, individuals feel more confident about their potential to succeed when implementing entrepreneurial behaviors.

As a result, we consider government, context and university supports as underlying dimensions of a second-order factor that we label environmental support, and we model its direct impact on perceived entrepreneurial behavior control.

As for environmental influence, it is no wonder that dynamic and heterogeneous environments foster innovative, proactive and risk-taking behaviors (e.g. entrepreneurial behaviors) (Covin & Slevin, 1989; Miller & Friesen 1982a-b). Scholars have argued that without market heterogeneity there is no room for entrepreneurship (Sakarya, Eckman, & Hyllegard, 2007) and, as a consequence, there are fewer opportunities for individuals to influence and control their entrepreneurial behaviors. Firms operating in many different markets are likely to learn from their broad experience with competitors and customers.

As a result, we propose that those entrepreneurs who operate in dynamic and heterogeneous markets perceive a higher control over their entrepreneurial behaviors. Specifically, market heterogeneity makes entrepreneurs more confident about the possibility of diversifying their actions and, even in tough periods, to find more alternatives to make their business succeed and, therefore, have more chances to implement entrepreneurial behaviors. The same argument applies to entrepreneurs operating in industries characterized by high growth rates, with high innovation potential, and at the initial stages of their life cycles. We argue that these characteristics enhance individuals' perceptions of the opportunity (current and future) and, as a consequence, of their potential to implement and exert control over their entrepreneurial behaviors.

As a result, consistent with the idea that the environment shapes and fosters entrepreneurial behaviors, we consider market heterogeneity, as defined by Miller and Friesen, (1982b), and industry opportunity, as defined by Miller (1987), as underlying dimensions of a second-order factor we label environmental influence, and we model its direct impact on perceived entrepreneurial behavior control.

4. RESEARCH DESIGN

4.1 The sample

Despite the increasing attention toward entrepreneurship, from both managers and policy makers, there is scant availability of data sources on the foundation of entrepreneurship. Other than Census data, there are very few databases that target entrepreneurship specifically, especially outside the US, either at firm or individual levels. Consequently, in order to shed some light on entrepreneurial intention formation, we decided to collect new empirical evidence on Italian New-Technology-Based-Firms (NTBFs) and their founders. We define an NTBF as a firm that has been established within the last 10 years (1997-2007) that at establishment was not controlled by another organization, neither business nor institution (although other organizations may have held minority shareholdings in the new firm), and operates in the following high-tech sectors: aerospace, biotechnology, computers, electronic components, internet services, medical and electronic instruments, multimedia content, optical equipment, pharmaceuticals, software, telecommunication equipment and telecommunication services (Colombo, Del Mastro & Grilli, 2004).

It has been widely acknowledged that the identification of random samples of both NTBFs and entrepreneurs, as well as the data gathering of related evidence represents a challenging procedure. Several studies in the entrepreneurship domain, in order to mitigate the non-randomization problem, target specific samples of either firms or entrepreneurs, controlling for some dimensions such as, geography, localization, demographics, and industry (Autio, 1997). Consistent with this approach, we have identified a sample of NTBFs, all localized in the same region, established within the last ten years and operating in high-tech sectors; and we have studied their founders' intentional processes.

Our study is located in the Emilia Romagna region, in the north of Italy. We addressed the study of entrepreneurial activities within this region because Emilia Romagna has been

identified by the EU Commission as one of the leading regions in Europe for its increasing number of NTBFs and, more generally, for its proactive role in supporting research-to-industry technology transfer (Eurostat, 2005). In particular, in November 2003, the region adopted its first program for industrial research, innovation and technology transfer (PRRIITT), becoming the first case of an Italian region with its own law concerning innovation. In particular, Emilia Romagna has been acknowledged to be one of the best regions within the EU in supporting technology-transfer activities. Both the regional universities and the research laboratories are increasingly involved in the commercialization of new technologies.

Because of these emerging trends, we primarily focused on high-tech firms created as a result of technology transfer activities enacted within universities and public research centers. It has been acknowledged that several NTBFs have been established, in Emilia Romagna, as a result of both formal and informal technology transfer activities from university and public research laboratories. Drawing on the previous studies of both Piccaluga and Balderi (2007) and Fini et al. (2008), and through the websites of the regional universities, of the public research centers and of the technology transfer offices, we identified a population of 89 NTBFs established as a result of technology transfer activities. Through the databases of the Chamber of Commerce of Bologna, we also gathered information on this regional NTBF population. Specifically, we retrieved the name of the company, the legal status, the address (in some cases the telephone number), the ATECO codification (industry codification), the year of establishment, the location and a general description of its operations. Then, we completed the information relating to the 89 NTBFs subsequent to technology-transfer activities, and we matched them with a sample of other high-tech firms (non-subsequent to technology-transfer activities) in terms of: industry (ATECO codification), year of establishment and localization. We ended up with a sample of

178 NTBFs, not controlled by other organizations, established within the last decade, all localized in the same region and currently operating in high-tech industries. We contacted all of them and, after several rounds of e-mails and phone calls, we set up face-to-face interviews with 200 entrepreneurs among the 523 founders of 133 NTBFs. All interviews were conducted by the same interviewer (one of the authors) on the basis of a structured questionnaire, and each lasted, on average, two hours. The data collection started in November 2006 and was completed at the beginning of May 2007.

4.2 Questionnaire and preliminary analyses

We developed a survey to collect primary data directly from entrepreneurs. The questionnaire addressed all the previously reviewed domains (demographic characteristics, personal traits, psychological characteristics, individual skills and prior knowledge, social ties and network, organizational support, environmental support, environmental influence, entrepreneurial intention and the dimensions of the theory of planned behavior)⁴.

The dependent variable, entrepreneurial intention, has been operationalized with an individual-level version of the strategic posture scale (Covin & Slevin 1989).

As previously stated we characterize the entrepreneurial intention concept in terms of willingness to create new value within an existing organization. This is accomplished through the engagement in innovative, proactive and risky actions. Innovativeness reflects an entrepreneur's intention to have his/her firm engaged in new experimentation and creative processes that may result in new products, services, or technological processes. Proactiveness suggests the entrepreneur's forward-looking perspective, which is supposed to be a characteristic of a marketplace leader who has the foresight to act in anticipation of future

⁴ We have also gathered some firm level information that we do not include in this contribution; both questionnaires (individual level and firm levels) are available upon request from the authors (both in Italian and English).

demand and shape the environment. Riskiness measures the entrepreneur's willingness to engage in risky projects and his/her preferences for bold versus cautious acts in order to achieve firm objectives. As a consequence, relying on the previous contributions of Miller (1983) and Covin and Slevin (1989), we define entrepreneurial behavior as the creation of new value through the engagement in innovative, proactive and risky activities.

In order to reduce the sources of common method bias we avoided asking the respondents to provide retrospective accounts of their attitude, perceptions and intentions. We also used different scale formats such as Likert-style scales and semantic differential scales, as well as reverse coded and negatively worded items (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We ran a small-scale field pre-test to gather feedback on question phrasing and to find out if other relevant facets of the domains under study remained untapped. Subsequently, a panel of ten experts (professors and technology transfer managers), and ten entrepreneurs, validated the questionnaire. They provided very helpful insights with regard to the questionnaire's completeness and clarity, as well as an evaluation of the time needed to complete it. No major inconsistencies emerged from this pre-test phase.

We collected data from the 200 entrepreneurs. In Table 1 we report the domains we have included in our model; we exhibit the four macro-domains, the 14 scales, the number of items for each scale, the scale format, the research references, and the Composite Reliability indexes (CR) (see appendix for scales and items).

Insert Table 1 about here

All measurement and structural models described in the next section were tested using the LISREL 8.80 program (Joreskog & Sorbom 2006). The goodness-of-fit of the models, as suggested by Bentler (1990), was assessed based on a common set of measures: chi-square tests, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square

Residual (SRMR), Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI). Satisfactory model fits are indicated by non-significant chi-square tests, RMSEA values less than .09, SRMR values less than .10, and NNFI and CFI values greater than or equal to .90 (Browne & Cudeck, 1993; Marsh, Balla, & Hau, 1996). All analyses were performed on covariance matrices.

5. RESULTS

5.1 Validity and common method bias

Relying on the fourteen previously characterized domains, we tested a comprehensive model of the micro-foundation of entrepreneurial intention. We evaluated the internal consistency of the constructs, checking for convergent validity, through the assessment of the Composite Reliability (CR). CR is calculated as the sum of the square roots of the item-squared multiple correlations squared and divided by the same quantity plus the sum of the error variance (Werts, Linn, & Joreskog, 1974). Estimates of CR above .60 and statistically significant concept-to-domain coefficients ($t > 2.0$, $p < .05$) are usually considered supportive of convergent validity (Bagozzi & Yi, 1988). All values had CR significantly higher than the stipulated criteria, and all items were statistically significant. Table 1 reports the composite reliability index, while in the Appendix we report both the scales and items used in the study.

We also verified the discriminant validity of the constructs using a three-pronged approach: first, we computed the 95% confidence interval for each off-diagonal element of the phi matrix, showing that in no case does the interval include the value of 1.00. Second, we performed a more formal test of discriminant validity, comparing the model under scrutiny with a series of more restricted models in which the correlation between each pair of latent constructs (or traits) has been, for one pair of constructs at a time, constrained to unity. The significant differences in chi-square (one degree of freedom), between the null model and the

more restricted ones, points to a rejection of the hypothesis that any two constructs are not mutually distinct. Finally we determined that the average variance extracted by each latent variable's measure was larger than its shared variance with any other latent variable. This index estimates the amount of variance captured by a construct's measure relative to random measurement error (Fornell & Larcker, 1981).

One evident trait of this research is the heavy reliance on entrepreneurs as a single source of data. As a result, spurious associations between some of the variables of interest may emerge due to Common Method Variance (CMV). According to the vast literature devoted to the subject, two main approaches can be identified in order to deal with the confounding influence of CMV on empirical results: a procedural method and a statistical method (for a comprehensive review see Podsakoff et al., 2003).

From a procedural standpoint, great care was taken in the design of the questionnaire (i.e. proximal separation between the measurement of the predictor and criterion variables) and in the execution of the interviews. Unfortunately, the "inner nature" of the research made it impossible to collect data from different sources; limitations due to the entrepreneurs' tight schedules also inhibited the temporal distancing of different parts of the questionnaire. For the dimensions concerning environmental influences, we also checked the consistency of the data gathered. We assessed the correlation between our primary data and some observable dimensions of government, context, and university support. In the appendix (see note in Table A2) we report such coefficients.

From a statistical standpoint, additional remedies were implemented to control for the method biases that might occur in this particular research setting; more specifically, a conservative single-method bias was assumed. According to the specifications of the hierarchically nested co-variance structure models, originally recommended by Widaman (1985) and subsequently used by Williams, Cote, and Buckley (1989), we used Confirmatory

Factor Analysis (CFA) to test four alternative measurement models. Model 1 (Null) was a null measurement model assuming that no factors underlie the data and that inter-correlations between measures could be explained by random error only. Model 2 (Trait) was the full measurement model used in this study, in which the 14 traits of interest, plus random error, were assumed to underlie the data. Model 3 (Method) posited that variation in measures could be explained by a single method factor plus random error. Finally, Model 4 (Trait-Method) assumed that the data could be accounted for by the 14 traits in Model 3, plus a single uncorrelated method factor, plus random error. We ran the CFA analyses on the measurement model built with 57 indicators, 14 traits and a common method factor. The results are presented in Tables 2 and 3. Table 2 shows the results for Models 1- 4, while Table 3 reports the comparisons between models needed to test for the significance of trait and method effects.

Insert Tables 2 and 3 about here

In order to assess the presence of a trait effect we compared the Trait and Null models ($\Delta\chi^2(176) = 7767.97, p < .001$) and Trait-Method and Method models ($\Delta\chi^2(176) = 4500.33, p < .001$), revealing significant trait effects. Then, we proceeded to evaluate the presence of a common method bias, checking for possible method effects, through the assessment of the differences between Models 3 vs. 1 and Models 4 vs. 2. Both the comparisons between Method and Null models ($\Delta\chi^2(57) = 3407.70, p < .001$) and Trait-Method and Trait models ($\Delta\chi^2(57) = 140.06, p < .001$) reveal that the method effect is significant.

Conclusively, it can be assumed that the variance in the entrepreneurs' responses can be explained by the simultaneous effect of traits, method, and random error. The highly unsatisfactory fit of the Method model (M3) and the small (albeit significant) gain in fit achieved by adding the method factor to the Trait model (Method-Trait model, M4) support

the idea that common method bias accounts for a small variance in the data. Obviously, a decomposition of the total variance in the traits, method, and error components might provide a more formal answer to this fundamental question. Table 4 provides such a partition.

Insert Table 4 about here

As has been shown in Table 4, the impact of method bias is quite low, accounting for just 5% of the overall variance: a comparison to other empirical benchmarks gives further evidence to this assumption (Williams et al., 1989). Looking at individual measures (data are available upon request), the method bias is uniformly low: the only exceptions are the indicators underlying entrepreneurial self-efficacy and industry opportunities that exhibit a moderate amount of bias (.19 and .37, respectively). Therefore, in this specific case, we can safely state that the method bias will not play a relevant role in inflating the structural relations between predictor and criterion variables.

In sum, the results of the independence test, the assessment of the convergent and discriminant validities and the satisfactory estimation of the common method bias enabled us to proceed to the estimation of the structural model.

5.2 Structural model

The structural model (Figure 2) exhibits satisfactory measures of goodness-of-fit: $\chi^2(1513) = 2321.68$, $p \approx .00$, RMSEA = .052, SRMR = .091, NNFI = .90, CFI = .90. The empirical evidence partially supports the effectiveness of the theory of planned behavior in predicting intentions. Attitudes towards entrepreneurial behaviors ($\beta = .42$, $p < .001$) and perceived entrepreneurial behavior control ($\beta = .25$, $p < .05$) predict entrepreneurial intention, while the subjective norms path fails to reach statistical significance ($\beta = -.03$, n.s.).

As for the antecedents, all first order factors load heavily on the second-order ones. The tested model partially supports the hypothesized paths: psychological characteristics predict attitudes towards entrepreneurial behavior ($\gamma = .18, p < .1$) as well as individual skills ($\gamma = .26, p < .05$). Similarly, the path going from environmental influence to perceived entrepreneurial behavior control is positive and significant ($\gamma = .39, p < .01$). Environmental support shows no impact ($\gamma = .01, n.s.$).

Insert Figure 2 about here

In order to assess the nomological validity of the hypothesized causal paths, we tested a rival model regressing entrepreneurial intention on the four second-order latent variables. The rival model showed a poor fit $\chi^2(926) = 1423.97, p \approx .00, RMSEA = .054, SRMR = .087, NNFI = .81, CFI = .82$, and the regression paths from psychological characteristics, individual skills, environmental support, and environmental influence had no significant impact. Hence, the exogenous dimensions of the theory of planned behavior represent the best direct predictors of intention, both theoretically and empirically, and they perfectly mediate the impact of the proposed indirect antecedents (with the only exception being the environmental support).

6. DISCUSSION

6.1 Contribution

In the current study, drawing on managerial, sociological and psychological literature, we have proposed and tested a multidimensional model of entrepreneurial intention and its antecedents.

As pointed out in the introduction, this paper moves on from the recognition that there is only a limited understanding of the process (and of the underlying factors) through which

entrepreneurial intentions develop. This limitation is due to: a) a scant theoretical orientation of many of the contributions, particularly with regard to the explanatory variables considered as drivers of entrepreneurial intention; b) a lack of multidimensional models that consider different drivers of entrepreneurial intention together, as opposed to the usage of isolated drivers.

We believe that our contribution fills this gap. We propose a model of the micro-foundation of entrepreneurial intention, accounting for the factors that the literature has highlighted as relevant, and, within the same model, we assess their impact on entrepreneurial intention.

Moreover, there are other more specific contributions that this paper intends to make. From a theoretical point of view, while explaining the foundation of entrepreneurial intention, we test the effectiveness of the theory of planned behavior (Ajzen, 1991). According to our model, entrepreneurial intention is predicted by attitude towards entrepreneurial behavior and perceived entrepreneurial behavior control ($R^2=.26$). Conversely, subjective norm fails to reach statistical significance in predicting intention. As we stressed before, this is not a surprising finding. The literature consistently shows that subjective norm is the component that more often fails to predict behavioral intentions (Armitage & Conner, 2001).

Then, we also assess the nomological validity of the causal path between entrepreneurial intention and its set of antecedents. In doing so, we show that entrepreneurial intention is micro-founded, and it is primarily explained by psychological characteristics, individual skills, and environmental influence. The positive (indirect) influence of both psychological characteristics and individual skills on intention has already been highlighted in previous studies (Bird, 1988). Also environmental influence positively affects entrepreneurs' control over entrepreneurial behavior. This suggests, and at the same time supports the findings of previous studies (Miller, 1987), that there are industries having characteristics

(such as being in the initial stages of the technology life cycle, high appropriability regime, high growth rates and high degree of innovativeness of products/services) that are better suited to trigger the enactment of entrepreneurial behaviors. Also, market heterogeneity positively influences the formation of entrepreneurial intention, reinforcing the idea that the greater the diversity and breadth of markets, the greater will be the proactiveness in conceiving new innovative ideas and, as a consequence, in creating value.

On the other hand, our results show that environmental support fails to predict entrepreneurial intention. This suggests that the support coming from government, context and universities is not relevant in shaping entrepreneurial intentions. In dealing with this we should keep in mind that entrepreneurial intention reflects a state of mind directing a person's attention and action toward the enactment of entrepreneurial behavior. In other words, this dimension is a cognitive representation of the actions to be implemented to achieve entrepreneurial behavior. Therefore, it may be possible that the awareness of external support comes into play at later stages, when individuals are concretely implementing entrepreneurial actions and, in order to implement these actions better and to make them succeed, they look for (and are more sensitive to) external support. On top of this, we should not forget that for the purpose of this study we take entrepreneurial intention as a cognitive representation of actions to be implemented within established companies. It may be that external support within the same modeling process turns out to be relevant in the case of new venture's creation. Future research should address this specific issue and assess the differences (if any) between drivers of entrepreneurial intention within established organizations and in new independent venture creation processes.

Finally, it is also possible that different entrepreneurs value different types of support mechanisms in different ways. Further research should also be devoted to investigate this issue.

6.2 Limitations and future research

Notwithstanding the effort we put into carefully designing our research, this study suffers from some limitations.

First, the underlying assumption this contribution relies on is that much of what we consider ‘entrepreneurial activity’ (e.g. the establishment of new firms and the creation of new values in existing ones) is an intentionally planned behavior (Krueger et al., 2000). Behaviors are predicted by intentions that are influenced by individual and contextual domains. We acknowledge that some might argue otherwise.

Second, we recognize the exploratory and cross-sectional nature of this study. The specific sampling strategy on which this research is based is robust enough to grant the internal consistency of the obtained results, while greater care (and more research) is needed in order to generalize the results to a broader population.

Third, in our model we do not account for all factors that have been identified as possible determinants of entrepreneurial intention. We intentionally decided to exclude demographics and personal traits, because of their proved inefficacy in predicting entrepreneurship; and social ties and networks because we considered them only indirectly responsible for entrepreneurial intention formation. We also accounted for organizational dimensions, only as control variables. This is consistent with our focus on a sample of young NTBFs, established in the last ten years, operating in high-tech industries, with similar and very ‘entrepreneurial’ types of organization. If we had to replicate this model to large companies, characterized by more formal and mechanistic organizational structures, it would be appropriate to include organizational factors within the model. Large companies might implement specific organizational mechanisms within their settings and this would influence individual entrepreneurial intention.

Fourth, in this contribution we see entrepreneurial self-efficacy as being more similar to a psychological characteristic, as argued by Manstead and Van Eekelen (1998) and by Chen, Green and Crick (1998), rather than to an action-oriented construct (such as perceived entrepreneurial behavior control). As a consequence, we separate the two dimensions, modeling entrepreneurial self-efficacy as a direct predictor of attitudes toward entrepreneurial behavior, and perceived entrepreneurial behavior control as a direct antecedent of entrepreneurial intention. We acknowledge that these two concepts are closely related (Ajzen, 1987) and that several other contributions are based on the assumption of this similarity (Fishbein, Hennessy, Yzer, & Douglas, 2003; Kolvereid & Isaksen, 2006).

Fifth, we have modeled skills and abilities as direct predictors of attitudes and not of perceived entrepreneurial behavior control. Attitudes, in fact, are influenced by internal dimensions (inside the individual), such as psychological characteristics and abilities, while perceived behavioral control is predicted by external dimensions (outside the individual), such as environmental and organizational factors (Manstead & Van Eekelen, 1998). Despite this chosen position we acknowledge that some other scholars might consider individual skills and prior knowledge as direct antecedents of perceived behavioral control. Finally, we should not forget that we have focused on entrepreneurial intention as the creation of new value within existing organizations. Future research should be devoted to assessing the model's validity in also addressing the study of new independent venture creation. On top of that, more attention should also be devoted to assessing the existence of different types of entrepreneurs, who might have developed different values, missions and culture (for example as a result of their affiliation to different organizations) that might result in different entrepreneurial processes.

6.3 Implications for manager and entrepreneurs

In this paper we have focused on drivers of entrepreneurial intention within established organizations. Our study is based on newly established companies, and a better understanding of the factors fostering individuals to be entrepreneurial is a central issue for both managers and entrepreneurs. As the extant managerial literature points out, especially in small and young NTBFs, the role of intentional dimensions is critical for explaining organizational behaviors. In small entrepreneurial firms, as argued by Baum and Wally (2003), organizational behaviors (and performance) can be seen as a result of the enactment of individual intentions. Beyond that, it has been demonstrated that the strategic orientation of managers and entrepreneurs is likely to be aligned with the strategic orientation of their firms (Wiklund & Shepherd, 2003). Thus, learning that entrepreneurial intention is differently enacted in varied micro-domains has managerial implications.

Specifically dealing with factors related to the individual domain, we know that personality traits (such as passion and tenacity) are out of both managers and entrepreneurs' control. Psychological characteristics are not. In other words, as far as these latter may be influenced and shaped by the specific entrepreneurial context, as already argued by Baum et al. (2001), they become of interest for managers and entrepreneurs for promoting the development of entrepreneurial intentions within their companies. As a result, great attention will be devoted to creating the conditions for raising risk-taking propensity and entrepreneurial self-efficacy within their firms.

Individual skills and competencies are relevant triggers of entrepreneurial intention. Managers and entrepreneurs, other than hiring individuals or teams with an already developed set of technical, procedural and managerial skills, should also pay attention to nurturing these competencies (as a whole) along the way, investing in training at different levels. In terms of the knowledge concerning a technology, managers should ensure their people keep pace with

technology development and advancement, remaining aware of technology changes and their potential impacts on the organization. The availability of technology skills, in fact, positively affects attitude toward entrepreneurship. At the same time they should create the conditions for their 'repository of technical knowledge' to be always in line with organizational changes to ensure they have the right procedural and organizational knowledge to be able to think through technology issues and then operate more effectively within their departments.

In line with this attention toward organizational, and more generally in environmental dimensions, we argue that companies should raise their alertness toward signals coming from the environment in which they operate, promoting a culture of openness toward the external environment. Both the industry (in which a company operates) and the markets (targeted by the company) may provide useful insights to trigger entrepreneurial processes and, as a consequence, create value. We believe that this is true not only for managers and entrepreneurs, but is particularly so for people at lower levels, especially those in technical areas who are more likely to generate innovation, who should be made aware of industry changes and market dynamics.

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EXHIBITS

TABLE 1
Predictor Measures

Domain and Predictor	Item	Scale format	Research reference	CR
<i>Psychological characteristics</i>				
Risk-taking propensity	4	1 to 7 Likert-like	Gomez-Mejia & Balkin, 1989	.75
Entrepreneurial self-efficacy	2	0 to 7 scale	Baum et al., 2001	.83
<i>Individual skills</i>				
Technical skills	3	1 to 7 scale	Gupta & Govindarajan, 2000	.72
Procedural skills	5	1 to 7 scale	Gupta & Govindarajan, 2000	.82
Managerial skills	5	1 to 7 Likert-like	Roberts & Fusfeld, 1981	.84
<i>Environmental support</i>				
Governmental support	2	1 to 7 Likert-like	Fini et al., 2008	.69
Context support	4	1 to 7 Likert-like	Fini et al., 2008	.78
University support	4	1 to 7 Likert-like	Fini et al., 2008	.75
<i>Environmental influence</i>				
Market heterogeneity	3	1 to 7 forced choice	Miller & Friesen, 1982b	.87
Industry opportunities	4	1 to 7 forced choice	Miller, 1987	.72
<i>Entrepreneurial intention and theory of planned behavior</i>				
Entrepreneurial intention ^a	9	1 to 7 forced choice	Covin & Slevin, 1989	.75
Attitude towards entrepreneurial behavior	9	1 to 7 forced choice	Ajzen, 1991	.88
Perceived entrepreneurial behavior control	2	1 to 7 forced choice	Ajzen, 1991	.68
Subjective norms	1	1 to 7 forced choice	Ajzen, 1991	-

^aThe nine original questions (six phrased as “my firm has...” and three as “top managers of my firm have...”) have been modified in “during the next year, I want my firm...”, in order to assess individuals’ entrepreneurial intention

TABLE 2
Common method bias nested models: goodness-of-fit statistics

Model	χ^2	Df	RMSEA	CFI	NFI
M1: Null	9809.58 ^a	1596	.160	.47	.39
M2: Trait	2041.61 ^a	1420	.047	.90	.77
M3: Method	6401.88 ^a	1539	.130	.60	.51
M4: Trait-Method	1901.55 ^a	1363	.045	.92	.79

Note: ^ap < .001; Root Mean Square Error of Approximation (RMSEA); Comparative Fit Index (CFI); Normed Fit Index (NFI)

TABLE 3
Common method bias nested models: χ^2 differences

Effect	Δ Model	$\Delta\chi^2$	Δ df	p-value
Trait	M2 – M1	7767.97	176	< .001
	M4 – M3	4500.33	176	< .001
Method	M3 – M1	3407.70	57	< .001
	M4 – M2	140.06	57	< .001

TABLE 4
Decomposition of variance in measures

	Trait	Method	Error
Model 4: Trait-Method	.46	.05	.49
Williams et al., (1989)	.50	.27	.23

FIGURE 1
Conceptual model of the micro-foundation of entrepreneurial intention

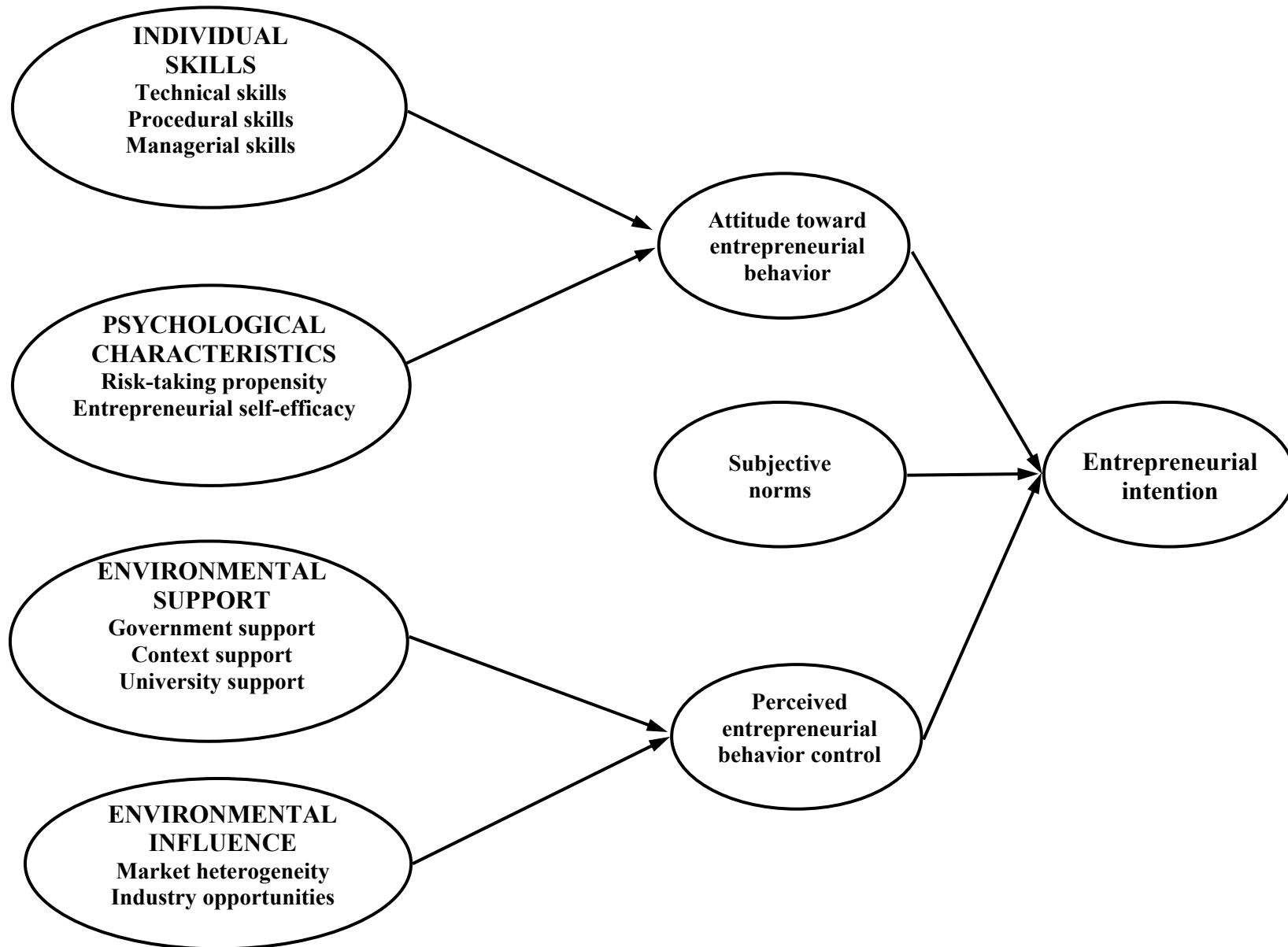
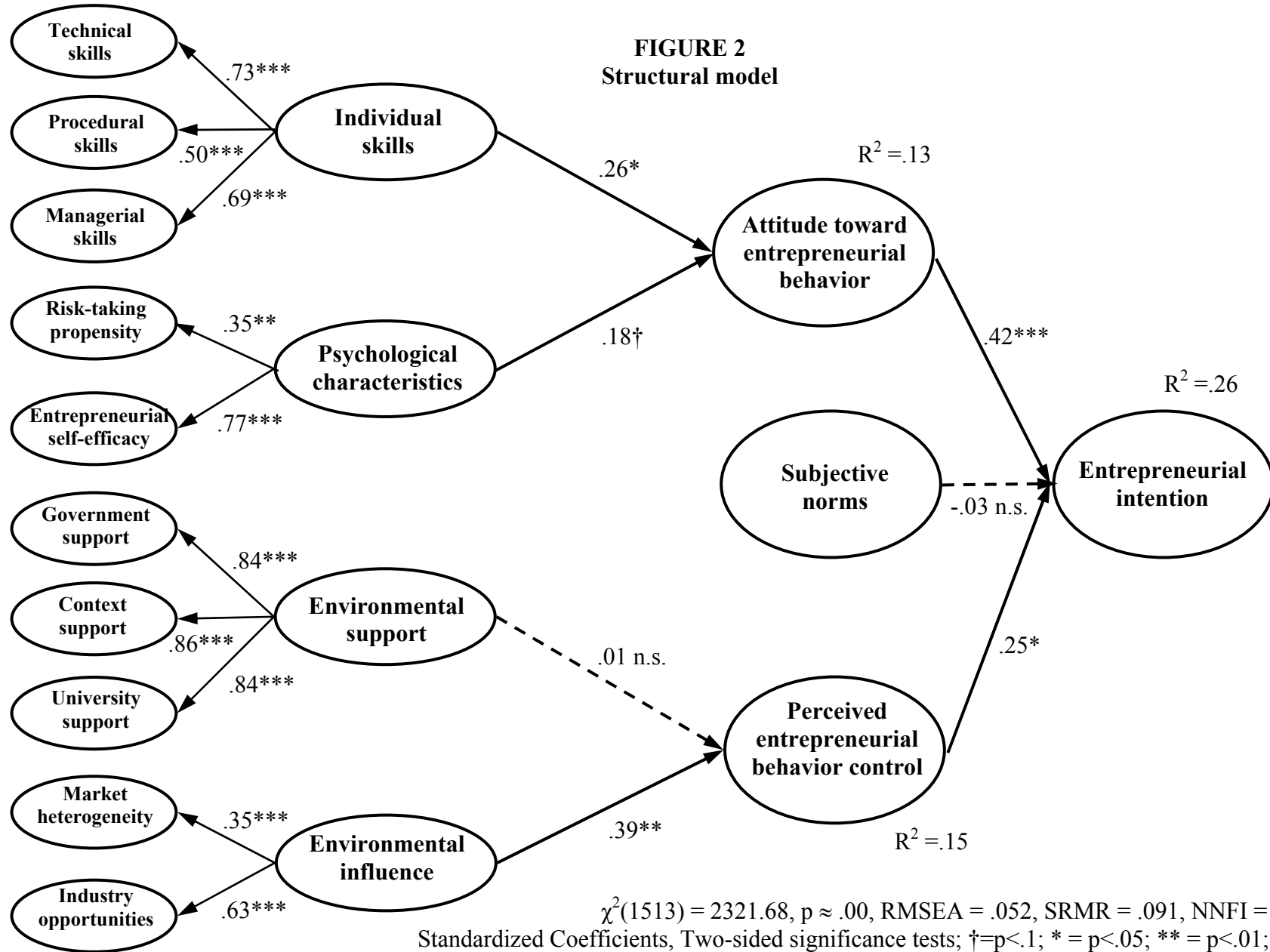


FIGURE 2
Structural model



APPENDIX

TABLE A1
Correlation table

	Mean	Std. Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Entrepreneurial intention	5.06	.76													
2. Attitude toward entrepreneurial behavior	4.73	.62	.37												
3. Subjective norms	5.70	1.10	.08	.21											
4. Perceived entrepreneurial behavior control	3.67	1.31	.17	.12	.18										
5. Risk taking propensity	4.46	1.13	.26	.20	.02	.06									
6. Entrepreneurial self-efficacy	4.87	1.73	.39	.23	.07	.18	.15								
7. Technical skills	4.24	1.46	.05	.12	.14	.12	.08	.17							
8. Procedural skills	3.35	1.27	.17	.18	.06	.11	.32	.19	.27						
9. Managerial skills	5.44	.93	.12	.20	.16	.22	.14	.16	.38	.23					
10. Government support	1.99	1.55	.10	-.01	.11	.20	-.09	.07	.07	-.08	.09				
11. Context support	1.73	1.16	.05	.10	-.03	.10	-.08	.16	.15	.01	.13	.49			
12. University support	1.89	1.73	-.04	.11	.00	.07	-.16	.14	.10	-.12	.20	.32	.59		
13. Market heterogeneity	5.18	1.71	.07	.01	.14	.09	.01	.11	.09	.01	.17	.05	.15	.14	
14. Industry opportunity	4.96	1.08	.20	.06	.18	.23	.01	.37	.23	.18	.22	.21	.14	.11	.26

Note: Correlation table is computed on normalized values; N=200;

TABLE A2
Details of Measures

Latent variable	Items description
Entrepreneurial intention	<p>In the next year I want my firm:</p> <ol style="list-style-type: none"> 1. (1) favors a strong emphasis on the marketing of tried and true products or services or (7) favors a strong emphasis on R&D, technological leadership and innovation 2. (1) favors the introduction of no new lines of products or services or (7) favors the introduction of very many new lines of products or services 3. (1) favors changes in product or services lines mostly of a minor nature or (7) favors quite dramatic changes in product or services line 4. (1) responds to action which competitors initiate or (7) initiates actions which competitors then respond to 5. (1) would be very seldom the first businesses to introduce new products/services or (7) would be the first business to introduce new products/services 6. (1) seeks to avoid competitive clashes, preferring a “live and let live” posture or (7) adopts a very competitive, “undo the competitors” posture 7. (1) has a strong proclivity for low risk projects (with normal and certain rates of return) or (7) has a strong proclivity for high risk projects (with chances of very high returns) 8. (1) explores the environment gradually, via timid, incremental behavior or (7) acts bold, wide-ranging in order to achieve the firm’s objectives 9. (1) adopts a cautious, “wait and see” posture in order to minimize the probability of making costly decisions or (7) adopts a bold, aggressive posture in order to maximize the probability of exploiting potential opportunities.
Attitude toward entrepreneurial behavior	<p>During the next year, emphasizing an entrepreneurial behavior would be:</p> <ol style="list-style-type: none"> 1. (1) Unpleasant or (7) Pleasant 2. (1) Useless or (7) Useful^a 3. (1) Unsuitable or (7) Suitable 4. (1) Negative or (7) Positive^a 5. (1) Regrettable or (7) Laudable^a 6. (1) Unpleasant or (7) Pleasant 7. (1) Harmful or (7) Beneficial 8. (1) Bad or (7) Good^a 9. (1) Foolish or (7) Wise.
Subjective norms	<p>Please assess your preference in the following single item scale:</p> <ol style="list-style-type: none"> 1. During the next year do you think your relevant others would appreciate your entrepreneurial behavior: (1) not at all or (7) significantly.
Perceived entrepreneurial behavior control	<p>Please assess your preference in the following two items scale:</p> <ol style="list-style-type: none"> 1. During the next year, emphasizing an entrepreneurial behavior do you think is going to be: (1) not at all easy or (7) really easy 2. To what extent do you think the following statement is true or false: “during the next year, if I would, I could act in an entrepreneurial way” (1) false or (7) true.
Risk-taking propensity	<p>Please indicate how strongly you agree or disagree with each statement by circling the appropriate number (1=strongly disagree; 7=strongly agree):</p> <ol style="list-style-type: none"> 1. I’m not willing to take risks when choosing a job or a company to work for 2. I prefer a low risk/high security job with a steady salary over a job that offers high risks and high rewards 3. I prefer to remain in a job that has problems that I know about rather than take the risk of working at a new job that has unknown problems even if the new job offers greater rewards 4. I view risk on a job as a situation to be avoided at all costs.

Entrepreneurial self-efficacy	<p>Thinking about your skills, write a number from the confidence scale below (1 to 7) to show how sure you are that you can beat the % change in 2007 (compared with 2006) [the same for 2008 compared with 2007]:</p> <ol style="list-style-type: none"> 1. Up 100% or better 2. Up 50% or better 3. Up 20% or better 4. Up 5% or better 5. No change or better 6. Down 5% or better 7. Down 10% or better 8. Down 25% or better.
Technical skills	<p>Please assess the skill levels you have now (1=no skills at all; 7=very skilled):</p> <ol style="list-style-type: none"> 1. Product designs 2. Process designs 3. Production systems.
Procedural skills	<p>Please assess the skill levels you have now (1=no skills at all; 7=very skilled):</p> <ol style="list-style-type: none"> 1. Accounting 2. Marketing 3. Purchasing and sales 4. Logistic and distribution 5. Finance.
Managerial skills	<p>Please indicate how strongly you agree or disagree with each statement by circling the appropriate number (1=strongly disagree; 7=strongly agree):</p> <ol style="list-style-type: none"> 1. I'm good at problem solving 2. I'm good at communicating my point of view and supporting my ideas 3. I'm good at motivating people and leading teams 4. I'm good at the maintaining interpersonal relationships and coordinating people 5. I'm good at developing resources and creating new competencies within the organizations.
Government support ^b	<p>To what extent do you think the following factors are supporting your entrepreneurial behavior (1=no support; 7=high support):</p> <ol style="list-style-type: none"> 1. National public founding 2. International (EU) public funding.
Context support ^c	<p>To what extend do you think the following factors are supporting your entrepreneurial behavior (1=no support; 7=high support):</p> <ol style="list-style-type: none"> 1. Regional founding (ex. PRRIITT, Spinner) 2. Existence of a business plan competition 3. Existence of regional technology transfer offices 4. Existence of regional patent support offices
University support ^d	<p>To what extend do you think the following factors are supporting your innovation activities and helping you in pursuing a significant venture growth (1=no support; 7=high support):</p> <ol style="list-style-type: none"> 1. Interest of public research institutions in investing in firms' equity 2. Possibility to access academic laboratories and equipments 3. Possibility to be hosted in a university incubator 4. Synergies between public research institutions and private firms
Market heterogeneity	<p>In the market your firm operates in, are there great differences among the product services with regard to (1=about the same for all product; 7=varies a great deal from one line to another):</p> <ol style="list-style-type: none"> 1. Costumers' buying habits 2. The nature of the competition 3. Market dynamism and uncertainty.
Industry opportunities	<p>In the industry your company operates in, in the last year:</p> <ol style="list-style-type: none"> 1. Growth opportunities in the environment: (1) have decreased dramatically or (7) have increased dramatically 2. Production/service technology in your principal industry: (1) has remained the same or (7) has changed very much 3. Rate of innovation of new operating processes and new products or services in your principal industry (1) rate has fallen dramatically or (7) rate has dramatically increased 4. Research and development (R&D) activity in your principal industry (1) has fallen off greatly or (7) has substantially increased.^a

Notes: ^a These items were reverse coded; ^b $r=.21$ ($p<.05$) with received amount of public funds; ^c $r=.37$ ($p<.001$) with participation to regional entrepreneurial support programs; ^d $r=.51$ ($p<.001$) with received incubation support
